APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Ramakrishna S. Budampati	Examiner: Amancio Gonzalez
Serial No.: 10/800,482	Group Art Unit: 2617
Filed: March 15, 2004	Docket: H0005509 (256.193US1)

For: REDUNDANT WIRELESS NODE NETWORK WITH COORDINATED RECEIVER DIVERISTY

APPEAL BRIEF UNDER 37 CFR § 41.37

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Commissioner for Patents
P.O. Box 1450
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Sir:

This Appeal Brief is presented in support of the Notice of Appeal to the Board of Patent Appeals and Interferences, filed herewith, from the Final Rejection of claims 1-23 of the above-identified application, as set forth in the Final Office Action mailed on November 21, 2008.

In connection with an Appeal Brief filed on January 29, 2008, the Commissioner of Patents and Trademarks was authorized to charge Deposit Account No. 19-0743 in the amount of $510.00 which represented the requisite fee set forth in 37 C.F.R. § 41.20(b)(2). In response to that Appeal Brief, the Patent Office reopened prosecution. The Appellants respectfully request that the previously paid fee be applied to this current Appeal Brief, and hereby authorize the Commissioner to charge Deposit Account No. 19-0743 in the amount of $30.00 to cover the difference between the former fee of $510.00 and the current fee of $540.00. The Appellants respectfully request consideration and reversal of the Examiner's rejections of the pending claims.

1. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the assignee, HONEYWELL INTERNATIONAL INC..

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

3. STATUS OF THE CLAIMS

The present application was filed on March 15, 2004 with claims 1-23. A non-final Office Action dated February 6, 2007 rejected claims 1-23. A Final Office Action dated June 29, 2007 and an Advisory Action dated November 1, 2007 maintained the rejection of claims 1-23. In response to an Appeal Brief that was filed on January 29, 2008, a non-final Office Action dated April 25, 2008 reopened prosecution, and maintained the rejection of claims 1-23. A Final Office Action of November 21, 2008 further maintained the rejection of claims 1-23. Claims 1-23 have been at least twice rejected, remain pending, and are the subject of the present appeal.

4. STATUS OF AMENDMENTS

No amendments have been made subsequent to the Final Office Action dated November 21, 2008.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Aspects of the present inventive subject matter include, but are not limited to, a redundant wireless node network with coordinated receiver diversity.

Independent Claim 1

In an embodiment, as recited in Independent Claim 1, a wireless network (FIG. 1, No. 100) includes multiple first wireless sensor nodes that transmit signals (p. 1, line 23, ¶ 3; FIG. 1, Nos. 140, 142, 144, 146, 148, 150, 152, and 154). The network also includes multiple independent infrastructure nodes (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 112, 114, 116, 118, 120, 122, 124, and 126) that receive the transmitted signals. The multiple independent infrastructure nodes are spaced from each other and each multiple independent infrastructure node is associated with a different set of wireless sensor nodes (¶ [0021], p. 6, lines 1-3). At least two infrastructure nodes receive a transmitted signal from a single first wireless sensor node (p. 4, lines 16-17; ¶ 16), and the single first wireless sensor node is associated with one of the at least two infrastructure nodes (¶ [0018], p. 5, line 4). The network further includes a module that combines at least two of the signals received at the multiple independent infrastructure nodes to estimate the signal transmitted by the single first wireless sensor node (p.5, lines 27-28, ¶ 21; p. 6, lines 21-22, ¶ 24; FIG. 1, Nos. 135, 110, 112, 114, 116, 118, 120, 122, 124, and 126).

Independent Claim 10

In another embodiment, as recited in Independent Claim 10, an infrastructure node (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 114, 116, 118, 120, 122, 124, and 126) for a wireless network (FIG. 1, No. 100) includes a first receiver (p. 5, lines 17-19, ¶ 20; FIG. 3, No. 320) that receives a transmitted signal from a wireless sensor node (p. 5, lines 17-19, ¶ 20; FIG. 3, No. 310). The infrastructure node further includes a second receiver that receives signals from other independent infrastructure nodes representative of the transmitted signal from the wireless sensor node that was received by the other independent infrastructure nodes (p. 6, lines 21-27, ¶ 24; FIG. 4, Nos. 410, 420, 430). The infrastructure node also includes a module that combines the signal received from the wireless sensor node and the signals from the other independent

infrastructure nodes to estimate the signal transmitted by the wireless sensor node (p. 5, lines 27-28; p. 6, lines 22-24, ¶ 24; FIG. 4, Nos. 410, 420, 430). The infrastructure node and the other independent infrastructure nodes are spaced from each other and the infrastructure node and each of the other independent infrastructure structure nodes are associated with a different set of wireless sensor nodes (¶ [0021], p. 6, lines 1-3).

Independent Claim 16

In another embodiment, as recited in Independent Claim 16, an infrastructure node (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 112, 114, 116, 118, 120, 122, 124, and 126) for a wireless network of sensor nodes (FIG. 1, No. 100) includes a means for receiving a transmitted signal from a wireless sensor node (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 112, 114, 116, 118, 120, 122, 124, and 126). The infrastructure node also includes a means for receiving the signals from other independent infrastructure nodes representative of the transmitted signal from the wireless sensor node (p. 4, lines 16-17, ¶ 16; FIG. 4, Nos. 410, 420, 430). The infrastructure node and the other independent infrastructure nodes are spaced from each other (¶ [0021], p. 6, lines 1-3), the infrastructure node and each of the other independent infrastructure nodes are associated with a different set of wireless sensor nodes (¶ [0021], p. 6, lines 1-3), and the wireless sensor node is associated with the infrastructure node (¶ [0018], p. 5, line 4). The infrastructure node further includes a means for combining the signal received from the wireless sensor node and the signals from the other independent infrastructure nodes to estimate the signal transmitted by the wireless sensor node (p. 5, lines 27-28, ¶ 21; p. 6, lines 6-22, ¶¶ 22, 23, and 24; FIG. 1, Nos. 135, 110, 112, 114, 116, 118, 120, 122, 124, and 126).

Independent Claim 17

In another embodiment, as recited in Independent Claim 17, a wireless network of sensor nodes (FIG. 1, No. 100; FIG. 2, No. 200) includes a means for transmitting low power wireless signals (p. 1, lines 9-10; p. 4, lines 29-30, ¶ 18; p. 5, line 1, ¶ 18; FIG. 2, Nos. 210, 220). The wireless network also includes multiple means for receiving the transmitted signals, wherein at least two of such means receive a transmitted signal from a single first wireless sensor node (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 112, 114, 116, 118, 120, 122, 124, and 126; p. 4, lines 16-

17, ¶ 16). The wireless network further includes a means for combining at least two of the signals received at the multiple means for receiving the transmitted signals for estimating the signal transmitted by the single first wireless sensor node (p. 5, lines 27-28, ¶ 21; p. 6, lines 6-22, ¶¶ 22, 23, and 24; FIG. 1, Nos. 135, 110, 112, 114, 116, 118, 120, 122, 124, and 126). The multiple means for receiving the transmitted signals are spaced from each other and each multiple means for receiving the transmitted signals is associated with a different set of wireless sensor nodes (¶ [0021], p. 6, lines 1-3).

Independent Claim 18

In another embodiment, as recited in Independent Claim 18, a method of processing signals at an infrastructure node for a wireless network (FIG. 1, Nos. 100, 116, 135) includes receiving a transmitted signal from a wireless sensor node (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 112, 114, 116, 118, 120, 122, 124, and 126; p.4, lines 16-17, ¶ 16). The method also includes receiving signals from other independent infrastructure nodes representative of the transmitted signal from the wireless sensor node (p. 6, lines 25-27, ¶ 24; FIG. 4, Nos. 410, 420, 430). The method further includes combining the signal received from the wireless sensor node and the signals from the other independent infrastructure nodes to estimate the signal transmitted by the wireless sensor node (p.5, lines 27-28, ¶ 21; p.6, lines 6-22, ¶¶ 22, 23, and 24; FIG. 1, Nos. 135, 110, 112, 114, 116, 118, 120, 122, 124, and 126). The infrastructure node and the other independent infrastructure nodes are spaced from each other (¶ [0021], p. 6, lines 1-3), the infrastructure node and each of the other independent infrastructure nodes are associated with a different set of wireless sensor nodes (¶ [0021], p. 6, lines 1-3), and the wireless sensor node is associated with the infrastructure node (¶ [0018], p. 5, line 4).

Independent Claim 19

In another embodiment, as recited in Independent Claim 19, a method of processing signals in a network having multiple independent infrastructure nodes and multiple sensor nodes (FIG. 1, Nos. 100, 140, 142, 144, 146, 148, 150, 152, 154, 110, 112, 114, 116, 118, 120, 122, 124, and 126) includes transmitting a signal from a first wireless sensor node (p. 1, line 23, ¶ 3; FIG. 1, Nos. 140, 142, 144, 146, 148, 150, 152, and 154). The method also includes

receiving the transmitted signal, wherein at least two infrastructure nodes receive the transmitted signal from the single first wireless sensor node (p. 3, lines 28-30, ¶ 14; FIG. 1, Nos. 110, 112, 114, 116, 118, 120, 122, 124, and 126; p. 4, lines 16-17, ¶ 16). The method further includes combining the signals received by at least two of the multiple independent infrastructure nodes to estimate the signal transmitted by the single first wireless sensor node (p. 5, lines 27-28, ¶ 21; p. 6, lines 6-22, ¶¶ 22, 23, and 24; FIG. 1, Nos. 135, 110, 114, 116, 118, 120, 122, 124, and 126). The multiple independent infrastructure nodes and the at least two infrastructure nodes are spaced from each other (¶ [0021], p. 6, lines 1-3), each of the multiple independent infrastructure nodes and each of the at least two infrastructure nodes is associated with a different wireless sensor node (¶ [0021], p. 6, lines 1-3), and the first wireless sensor node is associated with one of the multiple independent infrastructure nodes or one of the at least two infrastructure nodes (¶ [0018], p. 5, line 4).

This summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to each of the appended claims and its legal equivalents for a complete statement of the invention.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 2, 5, 6, 9, 10, 13, and 15-21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Oestreich (U.S. Patent No. 6,445,910) in view of Warrior et al. (U.S. Patent No. 7,242,294).

Claims 3, 4, 11, and 12 were rejected under 35 U.S.C. 103(a)) as being unpatentable over Oestreich (U.S. Patent No. 6,445,910) in view of Warrior et al. (U.S. Patent No. 7,242,294) and further in view of Ziv et al. (U.S. Patent Publication No. 20010018347).

Claims 7, 8, 14, 22, and 23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Oestreich (U.S. Patent No. 6,445,910) in view of Warrior et al. (U.S. Patent No. 7,242,294) and further in view of Smee et al. (U.S. Patent No. 6,990,137).

7. ARGUMENT

Applicable Law Under 35 U.S.C. § 103(a)

A patent may not be obtained for an invention, even though the invention is not identically disclosed or described in a single patent or other publication, if the differences between the subject matter of the invention and the prior art are such that the subject matter as a whole would have been obvious at the time that the invention was made to a person having ordinary skill in the art to which the subject matter of the invention pertains.[1] An obviousness analysis under § 103 is objective. That is, the scope and content of the prior art are determined, the differences between the prior art and the claims at issue are ascertained, and the level of ordinary skill in the pertinent art is resolved. It is against this background that the obviousness or nonobviousness of the subject matter is determined. Other considerations such as commercial success, long felt but unsolved need, and the failure of others might be utilized to shed light on the circumstances surrounding the origin of the subject matter sought to be patented.[2] While the obviousness analysis need not seek out precise teachings directed to the specific subject matter of a claim, the analysis should nevertheless be explicit, including some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, and not based on mere conclusory statements.[3] An indication of a teaching, suggestion, or motivation in the prior art may be part of this analysis, since there is no necessary inconsistency between the idea underlying the teaching, suggestion, and motivation test and the *Graham* analysis. However, the general principle of the teaching, suggestion, and motivation test should not be transformed into a rigid rule that limits the obviousness inquiry.[4] Rather, the approach to the determination of obviousness or nonobviousness should remain expansive and flexible.[5] And further while there is a need for caution in granting a patent based on a combination of elements found in the prior art,[6] a patent composed of several elements is not proved obvious merely by showing that each

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[1] 35 U.S.C. § 103(a).
[2] *KSR International Co. v. Teleflex Inc.,* 550 U.S. ____, p. 2 slip opinion (2007), *citing Graham v. John Deere Co. of Kansas City,* 383 U.S. 1, 15-17 (1966).
[3] *Id.,* p.14, *citing In re Kahn,* 441 F.3d 977, 988 (Fed. Cir. 2006).
[4] *Id.,* p. 15.
[5] *Id.,* p. 11.
[6] *Id.,* p.11.

of its elements was, independently, known in the prior art. Therefore, it can be important to identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.[7]

Rejection Of Claims Under 35 U.S.C. § 103(a)

Claims 1, 2, 5, 6, 9, 10, 13 and 15-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oestreich (U.S. 6,445,910 B1), hereafter "Oestreich," in view of Warrior et al. (US 7,242,294 B2), hereafter "Warrior".

Claims 3, 4, 11 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oestreich (U.S. 6,445,910 B1), hereafter "Oestreich," in view of Warrior et al. (US 7,242,294 B2), hereafter "Warrior", as applied to claims 1, 2 and 10, further in view of Ziv et al. (US 20010018347 A1), hereafter "Ziv."

Claims 7, 8, 14, 22 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oestreich (U.S. 6,445,910 B1), hereafter "Oestreich," in view of Warrior et al. (US 7,242,294 B2), hereafter "Warrior", as applied to claims 6, 13 and 21, further in view of Smee et al. (US Pat. 6,990,137), hereafter "Smee".

The Applicant respectfully seeks the reversal of these rejections.

The Final Office Action admits that Oestreich does not disclose a network of sensor nodes wherein multiple independent infrastructure nodes are spaced from each other, and each multiple independent infrastructure node is associated with a different set of wireless sensor nodes. The Final Office Action further admits that Oestreich does not disclose a wireless sensor node that is associated with one of at least two infrastructure nodes.

However, the Final Office Action contends that Warrior discloses multiple independent infrastructure nodes (or access points) 402_{n1} and 402_{n2}, that each independent infrastructure node is associated with a different set of wireless sensor nodes 401_{n1} and 401_{n2}, and that a single wireless sensor node is associated with one of the at least two infrastructure nodes. The Applicant basically agrees with this interpretation of Warrior. Notwithstanding, the Applicant respectfully submits that it would not have been obvious to one of skill in the art at the time that the invention was made to combine Oestreich with Warrior.

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[7] *Id.*, pp. 14-15.

First, the Applicant respectfully submits that the rationale provided by the Final Office Action does not establish a *prima facie* case of obviousness. The Final Office Action contends that it would have been obvious to combine the invention of Oestreich with the teachings of Warrior. That is, to include in Oestreich a network of sensor nodes wherein infrastructure nodes are associated with a different set of wireless sensor nodes. The Applicant respectfully submits that this rationale is faulty, since Oestreich relates to mobile devices that, by their very nature, move from place to place, and as such, any particular base station cannot be associated with any particular set of mobile devices. Rather, the base stations of Oestreich are associated with a constantly changing set of mobile devices, and therefore the teaching of Warrior that multiple sensors are associated with a single access point is simply not applicable to Oestreich, and therefore cannot provide a rationale for combining Oestreich with Warrior.

Moreover, contrary to the contentions in the Final Office Action, the mobile device communication network of Oestreich has no need to sense detailed measurements about a particular local environment. While this may be a function applicable to the sensor network of Warrior, it is inapplicable to the radio communication network of Oestreich. For this additional reason, the teachings of Warrior are inapplicable to Oestreich, and it would not have been obvious for one of skill in the art at the time that the invention was made to combine Oestreich with Warrior.

Similarly, there is no teaching in Warrior that the wireless sensors 401_{n1} or 401_{n2} should transmit to more than one of its access point nodes 402_{n1} or 402_{n2}. This further illustrates the non-obviousness of combining Oestreich and Warrior. Indeed, FIG. 4 of Warrior, which is cited by the Final Office Action, shows complete separation and independence between the sensor nodes 401_{n1} and the access node 402_{n2}, and complete independence and separation between the sensor nodes 401_{n2} and the access node 402_{n1}.

Furthermore, the teaching of Ostreich relating to a single node transmitting to two base stations is not applicable to Warrior, since there is no hand off needs between the sensor nodes and the access node in Warrior. This lack of need further illustrates that a combination of Ostreich and Warrior would not have been obvious to one or skill in the art at the time that the invention was made, and as such, a *prima facie* case of obviousness has not been established.

Finally, even if one of skill attempted to combine Oestreich and Warrior, there would be little likelihood of success—that is, the result would be an inoperable system. Specifically, the Oestreich reference relates to mobile devices that communicate with two or more base stations during a handoff procedure. If the stationary sensors and access points of Warrior were applied to Oestreich, the mobile devices of Oestreich would become stationary, thereby rendering highly ineffective the mobile radio communication system of Oestreich. Similarly, if the mobile communication devices of Oestreich were applied to Warrior, the sensors of Warrior that are placed in a particular environment for specific sensing purposes would be moved from that area, leaving that area unprotected, and rendering the Warrior system highly ineffective. The Applicant respectfully submits that a *prima facie* case of obviousness is not established when the combination renders the reference inoperable.[8]

In summary, sensor systems have strived to use low power to conserve battery life. The use of low power in a sensor network unfortunately results in low signal strength, which can lead to other problems in the sensor network. The Applicant recognized this shortcoming, and devised the claimed system in which, *inter alia*, a single wireless node transmits a signal to at least two infrastructure nodes, and the signal received at the two infrastructure nodes is subsequently combined and estimated. The Applicant's invention would not have been obvious to one of skill in the art, based on Oestreich and Warrior, either alone or in combination, without the use of hindsight based on the Applicant's disclosure. Consequently, a *prima facie* case of obviousness has not been established, and the Applicant respectfully requests the reversal of the rejection of the claims.

[8] *See* MPEP § 2143.01, Part V; *See also In re Gordon,* 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

SUMMARY

For the reasons argued above, the claims were not properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Oestreich in view of Warrior. It is respectfully submitted that the art cited does not render the claims obvious and that the claims are patentable over the cited art. Reversal of the rejection and allowance of the pending claims are respectfully requested.

Respectfully submitted,

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Date February 20, 2009 By ______________________
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 20th day of February 2009.

Dawn M. Poole ______________________ Dawn M. Poole ______________________
Name Signature

8. CLAIMS APPENDIX

1. A wireless network of sensor nodes comprising:

multiple first wireless sensor nodes that transmit signals;

multiple independent infrastructure nodes that receive the transmitted signals, wherein the multiple independent infrastructure nodes are spaced from each other and each multiple independent infrastructure node is associated with a different set of wireless sensor nodes, and further wherein at least two infrastructure nodes receive a transmitted signal from a single first wireless sensor node, the single first wireless sensor node associated with one of the at least two infrastructure nodes; and

a module that combines at least two of the signals received at the multiple independent infrastructure nodes to estimate the signal transmitted by the single first wireless sensor node.

2. The wireless network of claim 1 and further comprising a central controller that receives signals from the independent infrastructure nodes and contains the module that combines the signals.

3. The wireless network of claim 2 wherein the infrastructure nodes are hardwired to the central controller.

4. The wireless network of claim 2 wherein the infrastructure node comprises a wireless transceiver for communicating with the central controller.

5. The wireless network of claim 1 wherein the first wireless nodes transmit signals that are representative of a sensed parameter.

6. The wireless network of claim 1 wherein the signals are combined using a diversity technique.

7. The wireless network of claim 6 wherein wireless channel coefficients that are associated with the RF links between the first wireless sensor node and the infrastructure nodes are used for combining the signals.

8. The wireless network of claim 7 wherein the diversity technique comprises maximal ratio combining.

9. The wireless network of claim 1 wherein one of the infrastructure nodes receives signals from other infrastructure nodes and combines the signals received by the multiple infrastructure nodes.

10. An infrastructure node for a wireless network, the infrastructure node comprising:

a first receiver that receives a transmitted signal from a wireless sensor node;

a second receiver that receives signals from other independent infrastructure nodes representative of the transmitted signal from the wireless sensor node that were received by the other independent infrastructure nodes; and

a module that combines the signal received from the wireless sensor node and the signals from the other independent infrastructure nodes to estimate the signal transmitted by the wireless sensor node;

wherein the infrastructure node and the other independent infrastructure nodes are spaced from each other and the infrastructure node and each of the other independent infrastructure structure nodes are associated with a different set of wireless sensor nodes.

11. The infrastructure node of claim 10 wherein the infrastructure node is hardwired to a central controller.

12. The infrastructure node of claim 10 and further comprising a wireless transceiver for communicating with a central controller.

13. The infrastructure node of claim 10 wherein the signals are combined using a diversity technique.

14. The infrastructure node of claim 13 wherein wireless channel coefficients that are associated with the RF links between the wireless sensor node and the infrastructure nodes are used for combining the signals.

15. The infrastructure node of claim 13 wherein the diversity technique is selected from a group consisting of maximal ratio combining, equal gain combining, selection combining and switching combining.

16. An infrastructure node for a wireless network of sensor nodes, the infrastructure node comprising:

means for receiving a transmitted signal from a wireless sensor node;

means for receiving the signals from other independent infrastructure nodes representative of the transmitted signal from the wireless sensor node, wherein the infrastructure node and the other independent infrastructure nodes are spaced from each other, and the infrastructure node and each of the other independent infrastructure nodes are associated with a different set of wireless sensor nodes, and further wherein the wireless sensor node is associated with the infrastructure node; and

means for combining the signal received from the wireless sensor node and the signals from the other independent infrastructure nodes to estimate the signal transmitted by the wireless sensor node.

17. A wireless network of sensor nodes comprising:

means for transmitting low power wireless signals;

multiple means for receiving the transmitted signals, wherein at least two of such means receive a transmitted signal from a single first wireless sensor node; and

means for combining at least two of the signals received at the multiple means for receiving the transmitted signals for estimating the signal transmitted by the single first wireless node;

wherein the multiple means for receiving the transmitted signals are spaced from each other and each multiple means for receiving the transmitted signals is associated with a different set of wireless sensor nodes.

18. A method of processing signals at a infrastructure node for a wireless network, the infrastructure node performing the method comprising:

receiving a transmitted signal from a wireless sensor node;

receiving the signals from other independent infrastructure nodes representative of the transmitted signal from the wireless sensor node; and

combining the signal received from the wireless node and the signals from the other independent infrastructure nodes to estimate the signal transmitted by the wireless sensor node;

wherein the infrastructure node and the other independent infrastructure nodes are spaced from each other, and the infrastructure node and each of the other independent infrastructure nodes are associated with a different set of wireless sensor nodes, and further wherein the wireless sensor node is associated with the infrastructure node.

19. A method of processing signals in a network having multiple independent infrastructure nodes and multiple sensor nodes, the method comprising:

transmitting a signal from a first wireless sensor node;

receiving the transmitted signal, wherein at least two infrastructure nodes receive the transmitted signal from the single first wireless sensor node; and

combining the signals received by at least two of the multiple independent infrastructure nodes to estimate the signal transmitted by the single first wireless sensor node;

wherein the multiple independent infrastructure nodes and the at least two infrastructure nodes are spaced from each other, and each of the multiple independent infrastructure nodes and each of the at least two infrastructure nodes is associated with a different wireless node; and

wherein the first wireless sensor node is associated with one of the multiple independent infrastructure nodes or one of the at least two infrastructure nodes.

20. The method of claim 19 wherein combining is performed by a central controller that receives signals from the independent infrastructure nodes.

21. The method of claim 19 wherein the signals are combined using a diversity technique.

22. The method of claim 21 wherein wireless channel coefficients that are associated with the RF links between the first wireless sensor node and the infrastructure nodes are used for combining the signals.

23. The method of claim 22 wherein the diversity technique comprises maximal ratio combining.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.